In the Claims

The following is an amendment to and a complete listing of the claims which replaces all prior listings of claims in this application.

1. (previously presented) A priority encoder (PE) for a CAM, comprising:
a plurality of PE blocks, each receiving a plurality of match results corresponding to data entries in a corresponding data array block and, for determining an address of a highest priority data entry based on a physical location in the corresponding data array block during a CAM search-and-compare operation;

a register for storing a user defined priority value assigned to each of the plurality of PE block; and

means for evaluating the user defined priority values and the addresses determined by said plurality of PE blocks to select one PE block having the highest priority data entry.

2. (previously presented) The priority encoder as defined in claim 1, including a plurality of stages, said PE blocks being a

first stage of said PE.

3. (previously presented) A method for selecting the highest priority entry in a CAM upon receiving a search-and-compare instruction comprising the steps of:

receiving in each of a plurality of PE blocks in a first stage of a PE, a plurality of match results corresponding to data entries in a corresponding data array block and determining an address of the highest priority data entry based on a physical location in the data array block during a CAM search-and-compare operation;

storing in a register a user defined priority value assigned to each PE block;

forwarding the assigned priority value of a PE block to a PE unit in a next stage upon the PE block determining at least one match entry;

selecting a PE block having the highest priority entry by evaluating priority values and said determined addresses from the plurality of PE blocks; and,

selecting the highest priority entry in the selected PE block based on said physical location.

4. (previously presented) A method for selecting the highest priority entry in a CAM, said method comprising the steps of:

providing a priority encoder having a plurality of columns of sub-blocks connected in rows, each sub-block having a register to store a priority value defined by a user;

determining the highest priority data entry within a sub-block upon receiving a search and compare instruction;

comparing a priority value stored in the register in the sub-block with a priority value forwarded from a sub-block in a previous column in a row when a local and forwarded match flags are enabled; and,

selecting a priority value and a match address to forward to a sub-block in a next column in the row based on said comparison result.

5. (cancelled).

6. (previously presented) The method of claim 3, wherein the step of storing includes storing the user defined priority value when new data is stored in the corresponding data array block.

7. (previously presented) The method of claim 6, further including a step of assigning new priority values for each of the plurality of PE blocks.

8. (previously presented) The method of claim 7, wherein the step of assigning includes

a) determining the priority of said new data to be stored relative to priorities of the data entries stored in said CAM,

b) determining a free block for insertion of said new data,

c) writing said new data to said free block, and

d) updating said priority value registers to reflect said relative priority of said new data.

9. (previously presented) The method of claim 3, wherein the PE includes a plurality of PE units, each PE unit receiving first stage match results from a predetermined number of PE blocks for providing a second stage match result corresponding to a highest priority first stage match result, each of the first stage match

results including the address of the highest priority data entry from each data array block and a corresponding priority value.

10. (previously presented) The method of claim 9, wherein each PE unit determines the highest priority first stage match result by comparing the priority values corresponding to each first stage match result.

11. (previously presented) The method of claim 10, wherein each of the second stage match result includes a second stage match address and a corresponding priority value, each of the second stage match addresses including one of the addresses of the highest priority data entries having the highest priority from a corresponding predetermined number of PE blocks, and PE block address bits, the PE block address bits corresponding to a logical position of the PE block providing the one address.

12. (previously presented) The method of claim 11 wherein a third stage PE receives the second stage match results and provides the address of the highest priority data entry corresponding to a highest priority second stage match address.

13. (previously presented) The method of claim 12 wherein the third stage PE determines the address of the highest priority

data entry by comparing the priority values corresponding to each second stage match address.

14. (previously presented) The method of claim 13, wherein the address of the highest priority data entry includes the highest priority second stage match address and PE unit address bits, the PE unit address bits corresponding to a logical position of the PE unit providing the highest priority second stage match address.

15. (previously presented) The priority encoder as defined in claim 1, wherein the means for evaluating includes

a plurality of PE units, each of the plurality of PE units receiving a predetermined number of the user defined priority values and the addresses from corresponding PE blocks, for providing a local highest priority address and corresponding user defined priority value among the addresses and user defined priority values from the corresponding PE blocks, one of the plurality of PE units providing one local highest priority address as the address of the highest priority data entry.

16. (previously presented) The priority encoder as defined in claim 15, wherein the means for evaluating includes

a third stage PE for receiving the local highest priority addresses and the corresponding user defined priority values from the plurality of PE units, and for providing the address of the highest priority data entry from the one PE block.

17. (previously presented) The priority encoder as defined in claim 15, wherein each PE unit includes

first stage sub-priority encoders, each of the first stage sub-priority encoders receiving a subset of the predetermined number of the user defined priority values and the addresses from the corresponding PE blocks and for providing a first stage match result corresponding to the user defined priority value and the address having the highest priority of the subset, and

a second stage sub-priority encoder for receiving the first stage match results and for providing a second stage match result corresponding to the first stage match result having the highest priority.

18. (previously presented) The priority encoder as defined in claim 17, wherein the first stage sub-priority encoders includes

a first 2:1 priority encoder for receiving one subset of the predetermined number of the user defined priority values

and the addresses, for providing one first match result and,

a second 2:1 priority encoder for receiving another subset of the predetermined number of the user defined priority values and the addresses, for providing another first match result.

19. (previously presented) The priority encoder as defined in claim 18, wherein the second stage sub-priority encoder includes

a third 2:1 priority encoder for receiving the one first match result and the another first match result for providing the second stage match result.

20. (previously presented) The priority encoder as defined in claim 16, wherein the third stage PE includes

first stage sub-priority encoders, each of the first stage sub-priority encoders receiving a subset of the local highest priority addresses and the corresponding user defined priority values and for providing a first stage match result corresponding to the local highest priority address having the highest priority of the subset,

second stage sub-priority encoders for receiving the first stage match results, each of the second stage sub-priority encoders providing a second stage match result corresponding to

the first stage match result having the highest priority, and

a third stage sub-priority encoder for receiving the second stage match results, and for providing a third stage match result corresponding to the second stage match result having the highest priority, the third stage match result including the address of the highest priority data entry from the one PE block.